New Approach of Generating Business tool for gathering information using Intelligent Agent Technology

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Abstract— Intelligent agent are a new approach for generating software application for business purpose. The process of generating business tool is based on the concept of business intelligent. Business Intelligent is the technique used in spotting digging out and analysing business data such as sales revenue by products and departments or associated cost and incomes. Intelligent agent often aim to support better business decision making. Perhaps the most important advantage of agent is that they reduce coupling. In this paper we worked on generating of business tool for gathering information using intelligent agent technology. We used Java to create the intelligent agents. We used Java Agent Development Framework (JADE) for creating the intelligent agents. We generated business tool that can be implemented book trading system.

Keywords— business tool, JADE, intelligent agent, Belief desire intention, AMS, Business Process Management

I. INTRODUCTION

A business processes consist of a set of activtes connected in a structured whole. Business processes described the modes of operation of enterprise in gives situation, The software agent can be used to gain greater business insight and transparency ,organization urgently require a new generation of business intelligence(BI) tool and application that we allow cross-enterprise, inter-enterprise and external data to be integrated and analyzed

. An agent is an entity that carries out some task on behalf of a human. It can perceiving its environment through sensor and acting upon that environment through effectors

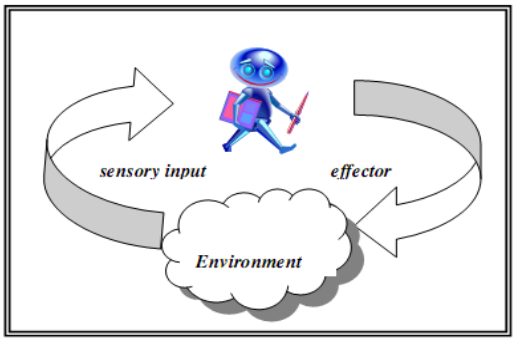

Figure.1 Agent interaction with its Environment

The action of an agent is performed after any given sequence percepts. The intelligent agent used the agent program for implementing agent mapping from percepts to action .basically the agent is an collection of program and architecture .the architecture might be a plain computer or it might include special-purpose hardware for certain task.

Agent=architecture + program

Some agents can have the ability to lie to other agents, or to users whereas other agents are always truthful (this property is known as veracity). Other properties of agents include the extent to which they can be trusted with delegated tasks and whether or not they degrade gracefully (when the agent encounter a new problem that it is unable to solve, does it fail completely or is it able to make some progress?). An agent's mobility is defined by its ability to move about on the Internet or another network. An agent can be in one of several states according to agent platform life cycle

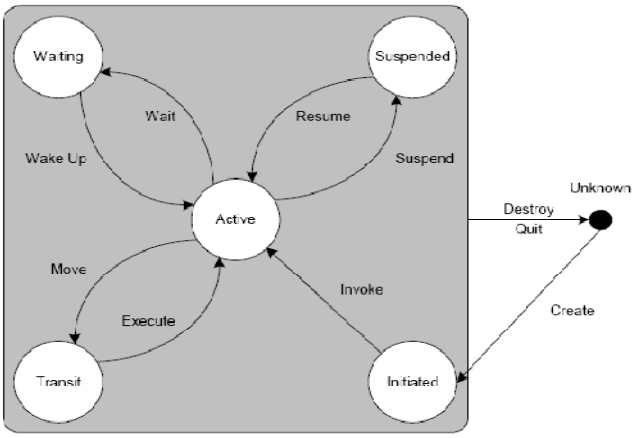

Figure.2 Agent Life Cycle Model

Initiated: The agent object is built, but hasn't registered, has neither a name nor an address and cannot communicate with another agents,

Active: The agent object is registered with the AMS, has a regular name and address and can access all the various JADE features.

Suspended: The agent object is currently stopped. Its internal thread is suspended and no agent behaviour is being executed.

Waiting: The agent object is blocked, waiting for something, its internal thread is sleeping on a java monitor and will wake up when some condition is met.

Deleted: The agent is definitely dead. The internal thread has terminated its execution and agent is no more registered with the AMS.

II. BDI ARCHITECTURE

Belief-Desire-Intentions is an approach to building an agent and multiagent system. BDI is used for describing Rational Agent(an rational agent should do whatever action is expected to maximize its performance measure on the basis of evidence provided by percept sequence and built in knowledge).this approach is inspired by logic and psychology.

The BDI approach is that focus on reasoning in resource bound agent. Resources bound agent may have limited computation power or limited memory. Belief are facts that representing what an agent believe about the world. Agent belief from sensing their world. Desire are goals or some desired end state ,an agent may have multiple desires which may be possible in conflict. Intention refer both to an agent's commitments to its desires (goals) and its commitment to the plans selected to achieve those goals

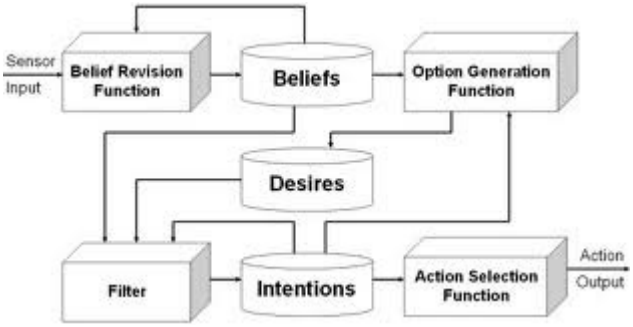

Figure.3 BDI Architecture

Beliefs capture information attitude. Desires motivational attitudes and intentions deliberative attitude of agents. The advantage of using mental attitude in the design and realization of agent and multi-agent system is the natural modeling and the high abstraction level which simplifies the understanding of system.

III. RELATED WORK

Many Papers have been published relating to application of intelligent agents. The intelligent are used in many software application.

In 1995 Katia Sycara described the developing distributed collections of intelligent information agents that cooperate asynchronously to perform goal-directed information retrieval and information integration in support of various tasks, such as finding information about people on the Internet, managing calendars and making arrangements to host visitors in an academic environment.

In 2009 Terry R Payne described the Agent Based Team Aiding in a Time Critical Task which evaluate the effectiveness of agent-based aiding in support of a time-critical team-planning task for teams of both humans and heterogeneous software agents. The team task consists of human subjects playing the role of military commanders and cooperatively planning to move their respective units to a common rendezvous point, given time and resource constraints. The objective of the experiment was to compare the effectiveness of agent-based aiding for individual and team tasks as opposed to the baseline condition of manual route planning.

In 2008 Gregg Economou described the Interaction without Commitments: An Initial Approach in which a number of theories of commitments which reply on the concept of agent belief, desires and intension (BDI). It shows that implicit commitments drivable from communications are sufficient & grantable in self organized agents. It shows that agent cannot be guaranteed of any social knowledge in completive environment. It describe the algorithm for finding deontic states

In 2012 Razvan V. Florian described the Autonomous artificial intelligent agents reviews the current state of the art in the research concerning the development of autonomous artificial intelligent agents. First, the meaning of specific terms, like agency, automaticity, autonomy, embodiment, situatedness and intelligence, are discussed in the context of this domain. The motivations for conducting research in this area are then exposed. Several principles that should guide autonomous agent research are reviewed. Of particular importance are the embodiment and situatedness of the agent, the principle of sensorimotor coordination, and the need for epigenetic development and learning capabilities. They ensure the adaptability, flexibility and robustness of the agent. Several design and evaluation considerations are then discussed.

In 2014 Veletsianos explored the use of a male and a female intelligent agent in education. Qualitative analysis of learner performance, motivation, availability and support of the agents, agent gender, and human-like characteristics is presented. Our intelligent agents converse via speech and text with students on matters concerning the design and

development of their electronic portfolio. Our contributions to the current literature are twofold. First, unlike current practices, we examine the use of intelligent agents over multiple sessions. Second, the dialogue between agents and learners is not predetermined. This allows the learners to be active participants in the learning process and interact with the agents as if they were interacting with an instructor, expert, or peer.

IV. BDI ARCHITECTURE BASED BUSINESS RULE EXECUTION

BDI architecture are probably the most popular agent architecture. Many different agent-based system have been realized that implement BDI with wide range of application demonstrating the viability of the model. BDI architecture is the Procedural Reasoning System (PRS). This architecture is implemented five key data structure: beliefs, desires, intentions, plans and interpreter.

- Belief represents the information an agent has about its environment, which may be incomplete or incorrect.
- Desires represent the task allocated to the agent and so correspond to the objectives or goals it should
- Intentions represent desires that may be followed by an agent in order to achieve its intention
- Plans specify some course of action that may be followed by an agent in order to achieve its intentions.

V. BDI IMPLEMENTATION WITH JADE

To integrate the aforementioned BDI concepts into the JADE agent platform, several additional components are necessary. The core of a BDI architecture is obviously the mechanism for plan selection. Plans not only have to be selected for goals, but for internal events and incoming messages as well collect the incoming messages and forward them to the plan selection mechanism a specialized component is needed. Another mechanism is required to execute selected plans and to keep track of plan steps to notice failures. As a first step towards the BDI integration a rudimentary event handling and plan selection mechanism called dispatcher was developed. In a similar fashion to the approach to integrate the aforementioned BDI concepts in to the JADE agent platform, several additional components are necessary. The core of a BDI architecture is obviously the mechanism for plan selection. Plans not only have to be selected for goals, but for

internal events and incoming messages as well. To collect the incoming messages and forward them to the plan selection mechanism a specialized component is needed. Another mechanism is required to execute selected plans, and to keep track of plan steps to notice failures .As a first step towards the BDI integration a rudimentary event handling and plan selection mechanism called dispatcher was developed. In a similar fashion to the approach

JADE behaviour was implemented to collect messages and to invoke the dispatcher. For any occurring event, the dispatcher would immediately select a plan, which had to be implemented as JADE behaviour that is dynamically added to and removed from the agent. This approach soon proved to be unsatisfactory because among other problems to dispatcher could not keep track of the executing plans when using the standard JADE scheduling mechanism. In a redesign all of the required functionality was implemented in cleanly separated components. The relevant information about beliefs, goals, and plans is stored in data structures accessible to all of these components.

The functionality of the BDI architecture is implemented JADE behaviour which run inside each Jade. The scheduler the dispatcher the message receiver and the timing behavior. These behaviour operate concurrently on the internal data-structures of the agent. The message receiver and the timing process are very simple behaviour with the single purpose to add new events to the event list. The message receiver listens for ACL messages from other agents and creates corresponding message events. The timing behaviour removes events from the timetable, when their time point is reached, and appends them to the list of events to be dispatched. The dispatcher is responsible for adopting goals by placing them on the intention stack and selecting plans to handle events from the event list. The selected plans are subsequently executed step-by-step by the scheduler that also implements the plan supervision. The behaviour will put themselves to sleep and restart each other appropriately to avoid that the agent unnecessarily

consumes CPU cycle, when it is actually idle. Implementing the functionalities into separate behavior provides a clean design and allows for

Flexible replacement of the behaviors with custom implementations, e.g. alternative scheduling mechanisms and BDI implementations can be tried out using modified versions of the corresponding behaviour. The next section describes the default implementations of these two behaviour The dispatcher is the heart of the JADE runtime system with the responsibility to select appropriate plans and plan instances to handle all events and goals inside the agent, facilitating the reactive and proactive behaviour.

VI. CONCLUSION

The new realities of business have created new imperatives for business information systems. Today's business systems must provide enterprise (and interenterprise) reach so that islands of disparate information can be integrated into a meaningful whole. They must be able to cope with the overwhelming complexity of distributed technology and an interenterprise information base. They must be open to survive a network-centric ecosystem. Rapid applications development goes without saying, and applications must be designed to embrace constant change. Business systems must be knowledge-based (not just information-based) if they are to cope with the incompleteness and ambiguity of real business processes and workflows. And they must be adaptive to meet the needs of the moment and bring productivity to an increasingly overwhelmed business user and self-service to our customers. Business processes are the core assets of enterprises. They turn the business potential into actual competitiveness on the market. To face the challenges posed by today's changing and uncertain business environment, traditional business process management (BPM) approaches are not sufficient anymore.

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